PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2003-075798
(43)Date of publication of application : 12.03.2003

(51)Int.Cl. G02F 1/13
G02F 1/1333
G03B 21/00
G03B 33/12
H04N 5/74

(21)Application number : 2001-261888
(22)Date of filing : 30.08.2001

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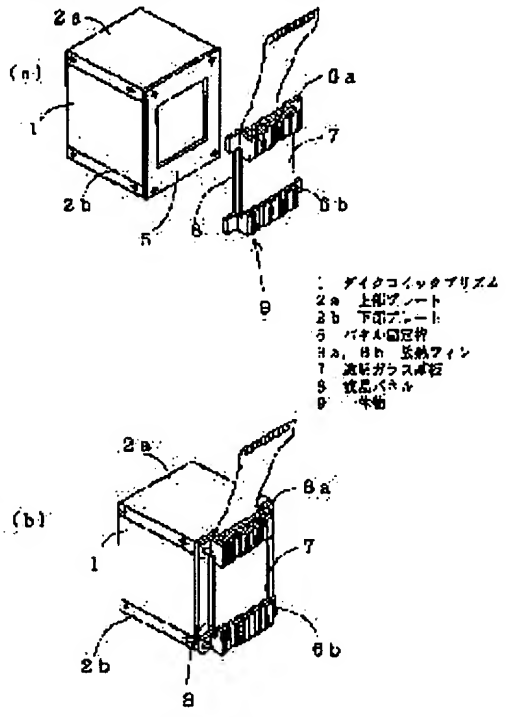
(54) METHOD FOR ASSEMBLING LIQUID CRYSTAL PROJECTOR AND LIQUID CRYSTAL PROJECTOR

(57)Abstract:
PROBLEM TO BE SOLVED: To improve operating efficiency in fixing a liquid crystal panel to a dichroic prism and to improve heat dissipation of the liquid crystal panel.
SOLUTION: An upper plate 2a and a lower plate 2b are arranged for the dichroic prism 1. An optical retardation plate 3, a polarizing plate 4 and a panel fixing frame 5 are fixed to the dichroic prism 1. On the other hand, a transparent glass substrate 7 and heat radiating fins 6a, 6b are fixed to a liquid crystal panel 8 with an adhesive having high thermal conductivity so as to form an integrated combination 9 of the liquid crystal panel 8, the transparent glass substrate 7 and the heat radiating fins 6a, 6b. The liquid crystal panel 8 integrated into the combination 9 is fixed, with the adhesive having the high thermal conductivity, to the panel fixing frame 5 fixed to the dichroic prism 1 by resistor-controlling.



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CLAIMS

[Claim(s)]
[Claim 1] The assembly approach of the liquid crystal projector characterized by fixing said liquid crystal panel to said radiation fin with adhesives with high thermal conductivity, and really [said] fixing an object in the assembly approach of the liquid crystal projector which equipped the dichroic prism with the optical prism unit which has arranged the liquid crystal panel and the radiation fin, really considering as an object and performing registration adjustment to said dichroic prism.
[Claim 2] Said radiation fin and said liquid crystal panel are a liquid crystal projector characterized by being really fixed with adhesives with the heat conductivity high in the liquid crystal projector which equipped the dichroic prism with the optical prism unit which has arranged the liquid crystal panel and the radiation fin an object.
[Claim 3] It is the liquid crystal projector according to claim 2 characterized by for said radiation fin being the thing of the shape of a frame which encloses the periphery of said liquid crystal panel, and said radiation fin and said liquid crystal panel fixing the periphery of said liquid crystal panel with said adhesives.
[Claim 4] The liquid crystal projector according to claim 2 with which the heat conductivity of said adhesives is characterized by being 1 - 3 W/mK.
[Claim 5] The liquid crystal projector according to claim 3 with which the heat conductivity of said adhesives is characterized by being 1 - 3 W/mK.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the assembly approach of a liquid crystal projector and a liquid crystal projector equipped with the optical prism unit which used the liquid crystal panel which modulates light according to a video signal.
[0002]
[Description of the Prior Art] In order to obtain a large-scale image screen, the liquid crystal projector which used the liquid crystal panel which modulates light according to a video signal is known. The conventional liquid crystal projector equips three fields of a dichroic prism with the optical prism unit which has arranged the liquid crystal panel, respectively, carries out color composition of each colored light bundle (R, G, B) after becoming irregular with the liquid crystal panel with a dichroic prism, and projects it on the screen installed in the position with the projector lens.
[0003] Moreover, for the so-called registration adjustment which piles up correctly the projection image from each liquid crystal panel on a screen, the conventional liquid crystal projector is equipped with right and left, the upper and lower sides, and the adjustment device of a hand of cut so that alignment between the pixels of each liquid crystal panel can be performed. Moreover, in order to double the focus of the projection image to a screen vividly, it has the focal adjustment device of pitching and the direction of a piece shake approximately.
[0004] Moreover, the miniaturization of an optical prism unit is called for with the miniaturization demand of a liquid crystal projector. However, if it becomes below size with a liquid crystal panel in the case of the optical prism unit which unified the adjustment device as mentioned above, the miniaturization of the adjustment device attached to this will become difficult. Moreover, this adjustment device becomes more large-sized, as it enables it to tune finely. Therefore, since it will be restrained by these adjustment devices even if it miniaturizes a liquid crystal panel, there is a structural limitation in the miniaturization of the optical prism unit which unified these adjustment devices.
[0005] Conventionally, these adjustment devices are excluded for the purpose of a miniaturization, and the device of carrying out adhesion immobilization of the direct liquid crystal panel is made by the dichroic prism. Moreover, in order to make easy exchange at the time of fault generating of a liquid crystal panel, only an adjustment device is excluded from an optical prism unit, a panel fixed frame is attached in a dichroic prism, and the proposal which fixes a liquid crystal panel to this is also made.
[0006] The erector of an optical prism unit who excluded only the adjustment device from this optical prism unit shows drawing to drawing 20 . As shown in (a) - (e) of drawing 20 , the assembly procedure of this optical prism unit (a) Up plate 2a and lower plate 2b are installed to a dichroic prism 1. (b) The phase contrast plate 3, a polarizing plate 4, and the panel fixed frame 5 are fixed to a dichroic prism 1 (up plate 2a and lower plate 2b). (c) They are immobilization and (e) completion to the panel fixed frame 5, carrying out registration adjustment of the liquid crystal panel 8 which pasted up immobilization and (d) transparence glass substrate 7 for radiation fins 6a and 6b on the panel fixed frame 5.
[0007]
[Problem(s) to be Solved by the Invention] A procedure (d) is the most difficult at this activity of a series of. Because, while handling performs registration adjustment of which a fine precision is required for the difficult liquid crystal panel 8, it is because it is necessary to paste the panel fixed frame 5. This is a matter of which an improvement is required also seen from the field of working capacity and registration adjustment precision.

Moreover, since radiation fins 6a and 6b are previously fixed to the panel fixed frame 5 rather than a liquid crystal panel 8, there is fault, like radiation fins 6a and 6b become obstructive in the case of registration adjustment of a liquid crystal panel 8.

[0008] Moreover, by this assembly approach, since immobilization of radiation fins 6a and 6b is a thread-fastening method, the location of radiation fins 6a and 6b is determined beforehand. Furthermore, in order to paste the panel fixed frame 5 fixed to the dichroic prism 1 in order of radiation fins 6a and 6b and a liquid crystal panel 8, depending on the location of the liquid crystal panel 8 after registration adjustment, the path clearance of radiation fins 6a and 6b and a liquid crystal panel 8 becomes large. When this path clearance becomes large, there is a possibility that it may become impossible to transmit efficiently generation of heat of a liquid crystal panel 8 to radiation fins 6a and 6b, and the engine performance of radiation fins 6a and 6b cannot fully be demonstrated.

[0009] Then, in this invention, while raising the working capacity at the time of fixing a liquid crystal panel to a dichroic prism, it aims at improving the heat dissipation nature of the liquid crystal panel.

[0010]

[Means for Solving the Problem] The assembly approach of the liquid crystal projector of this invention is characterized by really fixing an object in the assembly approach of the liquid crystal projector which equipped the dichroic prism with the optical prism unit which has arranged the liquid crystal panel and the radiation fin, fixing a liquid crystal panel to a radiation fin with adhesives with the high heat conductivity, really considering as an object, and performing registration adjustment to a dichroic prism.

[0011] Since according to this invention it is fixed to a radiation fin and a liquid crystal panel really serves as an object, handling of a liquid crystal panel can be easily performed by handling a radiation fin. That is, handling of the liquid crystal panel in the case of registration adjustment becomes easy, and the working capacity which fixes a liquid crystal panel to a dichroic prism improves.

[0012] The liquid crystal projector assembled by the above-mentioned approach is characterized by a radiation fin and a liquid crystal panel being really which was fixed with adhesives with high thermal conductivity objects.

[0013] In such a liquid crystal projector, since it is fixed to the radiation fin with adhesives with high thermal conductivity, a liquid crystal panel transmits generation of heat of a liquid crystal panel to a radiation fin efficiently through adhesives with high thermal conductivity, and is emitted into atmospheric air from a radiation fin.

[0014] Here, a radiation fin is made into the thing of the shape of a frame which encloses the periphery of a liquid crystal panel, and generation of heat of the thing to which the radiation fin and the liquid crystal panel fixed the periphery of a liquid crystal panel with adhesives with high thermal conductivity, then a liquid crystal panel is diffused from the periphery to a surrounding radiation fin through adhesives with high thermal conductivity, and comes to be emitted into atmospheric air from a radiation fin still more efficiently.

[0015] As for the thermal conductivity of the adhesives used for the liquid crystal projector of this invention, it is desirable that it is 1 - 3 W/mK. Heat transfer between these is most efficiently performed because thermal conductivity pastes up a liquid crystal panel and a radiation fin with the adhesives of 1 - 3 W/mK.

[0016]

[Embodiment of the Invention] (Gestalt 1 of operation) The flow Fig. in which it is shown like the erector of the optical prism unit of a liquid crystal projector [in / in drawing 1 / the 1st operation gestalt of this invention], drawing 2 - drawing 4 are drawings like the erector.

[0017] At step S101 shown in drawing 1 , up plate 2a and lower plate 2b are installed to a dichroic prism 1 (refer to drawing 2 (a)). At step S102, the phase contrast plate 3, a polarizing plate 4, and the panel fixed frame 5 are fixed to a dichroic prism 1. At this time, the phase contrast plate 3 and a polarizing plate 4 are stuck on a dichroic prism 1 with adhesives with high thermal conductivity, and the panel fixed frame 5 is fixed to up plate 2a and lower plate 2b by thread fastening (refer to drawing 2 (a) and (b)).

[0018] At step S103, the transparence glass substrate 7 and radiation fins 6a and 6b are fixed to a liquid crystal panel 8 with adhesives with high thermal conductivity, and it considers as a liquid crystal panel 8, the transparence glass substrate 7, and the one object 9 of radiation fins 6a and 6b (refer to drawing 3 (a) and (b)).

[0019] At step S104, it fixes with adhesives with high thermal conductivity to the panel fixed frame 5 fixed to the dichroic prism 1, carrying out registration adjustment of the liquid crystal panel 8 really used as the object 9

with radiation fins 6a and 6b (refer to drawing 4 (a) and (b)).
[0020] If the above-mentioned steps S101-S104 are performed to the 3rd page of the optical incidence of a dichroic prism 1, the optical prism unit 10 shown in drawing 5 R> 5 will be completed.
[0021] As mentioned above, by the assembly approach in this operation gestalt, before performing registration adjustment, a liquid crystal panel 8 and radiation fins 6a and 6b are fixed first. Therefore, since the field handled with radiation fins 6a and 6b increases, the liquid crystal panel 8 used as radiation fins 6a and 6b and one apparatus is excellent in workability rather than liquid crystal panel 8 simple substance performs registration adjustment like before. That effectiveness is large in order to do this activity about the 3rd page, red (R), green (G), and blue (B), with a liquid crystal projector especially like the optical prism unit 10 shown in drawing 5 .
[0022] Moreover, since adhesives with high thermal conductivity are used for immobilization of a liquid crystal panel 8 and radiation fins 6a and 6b, the path clearance of a liquid crystal panel 8 and radiation fins 6a and 6b can be suppressed to min. In addition, in this operation gestalt, although the silicone system resin which has the property which are thermal conductivity 1 - 3 W/mK extent, and carries out room temperature curing as adhesives with high thermal conductivity is used, it is also possible to use resin with thermosetting further in addition to acrylic resin, ultraviolet-rays hardening resin, and ultraviolet-rays hardening resin.
[0023] Radiation fins 6a and 6b are made into the quality of the material of aluminum with high thermal conductivity (thermal conductivity 240 W/mK), magnesium (thermal conductivity 156 W/mK), copper (thermal conductivity 420 W/mK), silver (thermal conductivity 432 W/mK), the aluminum that performed black alumite processing, the magnesium which carried out anodizing. Moreover, the transparence glass substrate 7 is stuck to the liquid crystal panel 8 using what has high thermal conductivity, such as sapphire (thermal conductivity 36 W/mK extent), a spinel (thermal conductivity 16 W/mK extent), a quartz, and neo SERAMU, with adhesives with high thermal conductivity (heat-curing mold transparence resin or ultraviolet curing mold resin which is thermal conductivity 1 - 3 W/mK extent, and has the property which carries out room temperature curing, such as transparent and colorless liquefied silicon gel adhesives).
[0024] Drawing 6 is the sectional view of jointing of a liquid crystal panel 8 and radiation fins 6a and 6b. Since the gap of a liquid crystal panel 8 and radiation fins 6a and 6b is buried with silicone system resin 11 with high thermal conductivity as shown in drawing 6 , the heat generated with the liquid crystal panel 8 can be efficiently missed to the direction of radiation fins 6a and 6b through this silicone system resin 11, and as shown in drawing 5 , it is emitted into atmospheric air from the heat dissipation fans 6a and 6b according to the air current from the lower part of the optical prism unit 10. This is very effective, in view of the viewpoint of the cooling effect of the liquid crystal panel which is the important property for which a liquid crystal projector is asked.
[0025] Moreover, since immobilization with the liquid crystal panel 8 after registration adjustment and a dichroic prism 1 is really which fixed the liquid crystal panel 8 to radiation fins 6a and 6b beforehand performed by adhesion with an object 9 and a dichroic prism 1, the adhesion field serves as radiation fins 6a and 6b, the panel fixed frame 5, and a liquid crystal panel 6 and the panel fixed frame 5, as shown in drawing 6 . Consequently, the adhesion area of a liquid crystal panel 8 and a dichroic prism 1 becomes possible [becoming large and performing stable immobilization].
[0026] In addition, in this operation gestalt, if the heat transfer rate between these may be efficiently performed in short not only in this, this invention is applicable [it is filled up with the silicone system resin 11 which is thermal conductivity 1 - 3 W/mK extent so that heat transfer between the transparence glass substrate 7 and a liquid crystal panel 8 and between the transparence liquid crystal panel 8, radiation-fin 6a, and 6b may be performed most efficiently, but], even if thermal conductivity is except this range.
[0027] (Gestalt 2 of operation) The decomposition perspective view showing the outline structure of the optical prism unit of a liquid crystal projector [in / in drawing 7 / the 2nd operation gestalt of this invention] and drawing 8 are the sectional views which omitted a part of optical prism unit of drawing 7 . In addition, in this operation gestalt, a sign common about the same configuration member as the 1st operation gestalt is attached, and explanation is omitted.
[0028] As shown in drawing 7 , in the optical prism unit 20 in the 2nd operation gestalt of this invention, the up plate 22 and the lower plate 23 for holding the panel fixed frame 21 with radiation-fin 21a are attached to the dichroic prism 1 which stuck the phase contrast plate 3 and the polarizing plate 4. In addition, in this operation gestalt, it is forming radiation fins 22a and 23a also in the up plate 22 and the lower plate 23, respectively, and

the heat dissipation disposition top of the optical prism unit 20 is planned.
[0029] The lower plate 23 is formed somewhat more greatly than the up plate 22, as shown in drawing 8 . Thereby, in the case of immobilization of the panel fixed frame 21 mentioned later, to the top face of the lower plate 23, the lower side face of the panel fixed frame 21, and the up top face of the panel fixed frame 21 and the side face of the up plate 22, an adhesives nozzle is made to approach from the slanting upper part, and it becomes easy to apply silicone system resin 11.
[0030] The conductive-heat plate 24 for polarizing plates with the high thermal conductivity which contacts in the periphery section of a polarizing plate 4 is formed in the outside of a polarizing plate 4. The conductive-heat plate 24 for polarizing plates is pasted up with silicone system resin 11 to the up plate 22 and the lower plate 23. Thus, by attaching the conductive-heat plate 24 for polarizing plates to the polarizing plate 4 which is one of the main sources of generation of heat of the optical prism unit 20, the heat generated with the polarizing plate 4 is efficiently transmitted to radiation-fin 21a of the panel fixed frame 21 through the up plate 22 and the lower plate 23, and heat dissipation nature is raised.
[0031] moreover, between the periphery of the phase contrast plate 3 and a polarizing plate 4, the up plate 22, and the lower plate 23 It is filled up with silicone system resin 11, and the heat of the phase contrast plate 3 and a polarizing plate 4 is efficiently transmitted to the up plate 22 and the lower plate 23 through this silicone system resin 11. He is trying to emanate into atmospheric air from radiation-fin 21a of the panel fixed frame 21 connected by the up plate 22, the lower plate 23, and silicone system resin 11.
[0032] The match plate 25 which intercepts and controls a part of outgoing radiation light of this liquid crystal panel 8 is formed in the optical outgoing radiation side side of a liquid crystal panel 8. In addition, it is also possible to exclude the thing which has the function of this match plate 25 for the above-mentioned conductive-heat plate 24 for polarizing plates, then a match plate 25.
[0033] The perspective view in which drawing 9 shows the detail of the panel fixed frame 21 with radiation-fin 21a, and drawing 10 are A views of drawing 9 , and drawing and drawing 11 which show the condition of having fixed the liquid crystal panel 8 are drawing showing the condition of having incorporated the panel fixed frame 21, to a dichroic prism 1.
[0034] As shown in drawing 8 and drawing 9 , since the transparence glass substrate 7 and a liquid crystal panel 8 are fixed, the panel fixed frame 21 is the thing of the shape of a frame which encloses the periphery of a liquid crystal panel 8, and is constituted as sacrifice section 21b which intercepts and controls a part of incident light to a liquid crystal panel 8. Moreover, the panel fixed frame 21 equips with radiation-fin 21a the part which serves as external surface in the condition of having included in the dichroic prism 1.
[0035] Moreover, as shown in drawing 10 , the inner circumference section by the side of the inside of sacrifice section 21b prepared jointing 26a which pastes up the periphery of a liquid crystal panel 8 with silicone system resin 11, and provides in the four corners resin inlet 26b for pouring in the silicone system resin 11 on which the transparence glass substrate 7 and a liquid crystal panel 8 are pasted up. Since an opening is formed in the four corners of this liquid crystal panel 8 when the liquid crystal panel 8 which fixed the transparence glass substrate 7 is installed in the panel fixed frame 21 by resin inlet 26b, it becomes easy to be filled up with silicone system resin 11. In addition, two and six are sufficient although resin inlet 26b is set to four in the example of drawing 10 . Moreover, in the example of drawing 10 , since silicone system resin 11 is poured into jointing 26a over the perimeter of a liquid crystal panel 8 from resin inlet 26b, the path clearance of the panel fixed frame 21 and a liquid crystal panel 8 is filled with silicone system resin 11 with high thermal conductivity, and the heat dissipation nature of a liquid crystal panel 8 is improved.
[0036] Moreover, the dimple 27 for receiving silicone system resin 11 is formed in the adhesion side with the up plate 22 of the panel fixed frame 21, and the lower plate 23. On the other hand, the resin injected hole 28 for pouring in silicone system resin 11 is formed in this dimple 27 of the up plate 22 and the lower plate 23, and a corresponding location. The dimple 27 of the panel fixed frame 21 is filled up with the silicone system resin 11 poured in from this resin injected hole 28, and it fixes the panel fixed frame 21, the up plate 22, and the lower plate 23. Moreover, silicone system resin 11 gives a dimple 27, and it also has an omission prevention function.
[0037] The flow Fig. in which it is shown like the erector of the optical prism unit in the 2nd operation gestalt of this invention which shows drawing 12 to drawing 7 , drawing 13 - drawing 19 are drawings like the erector.
[0038] At step S201 shown in drawing 12 , the phase contrast plate 3 and a polarizing plate 4 are stuck to the Gth page of a dichroic prism 1 (refer to drawing 13). At step S202, the up plate 22 and the lower plate 23 are

stuck to this dichroic prism 1 (R> drawing 14 4 reference). At step S203, the conductive-heat plate 24 for polarizing plates is stuck from on the polarizing plate 4 stuck on the dichroic prism 1 (refer to drawing 15), and it considers as the condition which shows in drawing 16 .

[0039] On the other hand, at step S204, the transparence glass substrate 7 is stuck to a liquid crystal panel 8 (refer to drawing 17 (a)). At step S205, to the liquid crystal panel 8 which stuck this transparence glass substrate 7, the panel fixed frame 21 with radiation-fin 21a and a match plate 25 are fixed (refer to drawing 17 (b)), and as shown in drawing 17 (c) and (d), it considers as a liquid crystal panel 8, the transparence glass substrate 7, 21with radiation fin a panel fixed frame 21, and the one object 29 of a match plate 25. In addition, drawing 17 (d) is drawing which looked at this drawing (c) from the flesh side.

[0040] And at step S206, the liquid crystal panel 8 used as the panel fixed frame 21 with radiation-fin 21a and the one object 29 of one apparatus is received. A dichroic prism 1 (the phase contrast plate 3, a polarizing plate 4, the up plate 22, with the lower plate 23) is handled. It is made to approach, registration adjustment is performed (refer to drawing 18), and radiation-fin 21a of the panel fixed frame 21 is pasted up on radiation-fin 22a of the up plate 22 fixed to the dichroic prism 1, and radiation-fin 23a of the lower plate 23 (refer to the drawing 1919). In addition, the activity same also about the Rth page and the Bth page as the above is done.

[0041] Here, silicone system resin 11 is applied from the slanting upper part to the top face of the lower plate 23, the lower side face of the panel fixed frame 21, and the up top face of the panel fixed frame 21 and the side face of the up plate 22. Even if silicone system resin 11 hangs down with that fluidity and falls at this time, it prevents that slot 21c of radiation fins 21a and 22a becomes a guide, and adheres to the transparence glass substrate 7. Moreover, when it replaces with silicone system resin 11 and solder is used, scattering of a solder ball or flux can be prevented by this slot 21c.

[0042] As mentioned above, also in the assembly approach in the 2nd operation gestalt, since the liquid crystal panel 8 and the panel fixed frame 21 with radiation-fin 21a are first fixed before performing registration adjustment, it excels in workability conventionally. Moreover, in this operation gestalt, the panel fixed frame 21 with radiation-fin 21a which has a complicated configuration is handled, and registration adjustment is not carried out, but since structure has handled the dichroic prism 1 side which has simple and moderate magnitude, it is stabilized, registration adjustment can be performed and it excels in working capacity and dependability further.

[0043] Moreover, as shown in drawing 8 , by making relatively the up plate 22 and the lower plate 23, and the panel fixed frame 21 with radiation-fin 21a into a level difference, even if adhesives are thermosetting resin and ultraviolet-rays hardenability resin, it is easy to apply, and workability, such as UV irradiation, is also improved. Furthermore, in order to apply adhesives in the culmination of registration adjustment or to make it harden, it is necessary to arrange a dispenser, the fiber for hardening, etc. around optical prism unit 20 but, and since the degree of freedom of the light source for adjustment, the arrangement area and the dispenser of the equipment for adjustment, or a fiber increases by considering as this structure, such arrangement area is separately securable. That is, since it becomes possible to install the light source and equipment for registration adjustment freely, it can arrange with a sufficient precision to the core of a dichroic prism 1, and registration adjustment can be performed.

[0044]

[Effect of the Invention] The following effectiveness can be done so by this invention.

[0045] (1) Since handling of the liquid crystal panel in the case of registration adjustment becomes easy by really fixing an object, fixing a liquid crystal panel to a radiation fin with adhesives with the high heat conductivity, really considering as an object, and performing registration adjustment to a dichroic prism, the working capacity which fixes a liquid crystal panel to a dichroic prism can improve, and the assembly cost of a liquid crystal projector can be reduced.

[0046] (2) In the liquid crystal projector assembled by the above-mentioned approach, since a radiation fin and a liquid crystal panel really which was fixed with adhesives with high thermal conductivity serve as an object, the path clearance of a liquid crystal panel and a radiation fin serves as min, generation of heat of a liquid crystal panel comes to be efficiently emitted into atmospheric air from a radiation fin through adhesives with the high thermal conductivity with which it filled up here, and they can improve the heat dissipation nature of a liquid crystal panel. Moreover, since the temperature rise of a liquid crystal panel can be conventionally suppressed by improvement in heat dissipation nature, the dependability of a liquid crystal panel can be

improved sharply. Moreover, since the rotational frequency of the cooling fan which cools an optical prism unit by improvement in heat dissipation nature can be lowered even if calorific value increases by a miniaturization and highly minute-ization of a liquid crystal panel, the noise of a cooling fan is made small, silence is raised, and the noise problem at the time of a liquid crystal projector spreading through domestic etc. can also be solved.

[0047] (3) Moreover, since a radiation fin is made into the thing of the shape of a frame which encloses the periphery of a liquid crystal panel, generation of heat of a liquid crystal panel diffuses a radiation fin and a liquid crystal panel from the periphery to a surrounding radiation fin through adhesives with high thermal conductivity by having fixed the periphery of a liquid crystal panel with adhesives with high thermal conductivity and it emanates into atmospheric air from a radiation fin still more efficiently, the liquid crystal projector which has improved heat dissipation nature further is obtained.

[0048] (5) By being 1 - 3 W/mK, heat transfer between the liquid crystal panel pasted up with these adhesives and a radiation fin can be performed most efficiently, and the thermal conductivity of adhesives can cool a liquid crystal panel further, and can lower that operating temperature.

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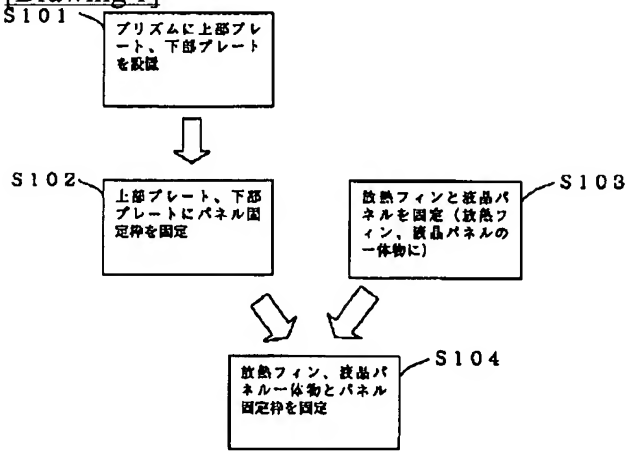
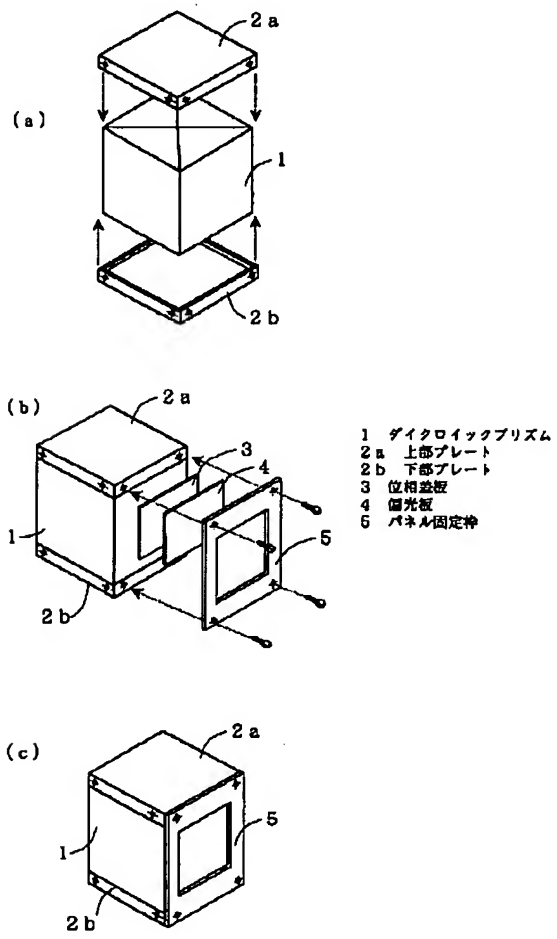
DRAWINGS

[Drawing 1]

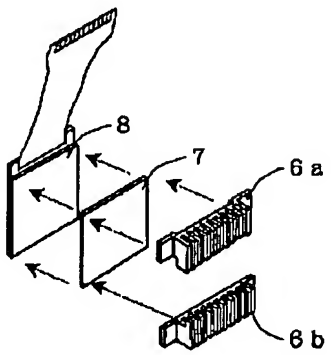


[Drawing 2]


(a)
2a
1
2b
(b)
2a
3
4
1
5
2b
1 ダイクロイックプリズム
2a 上部プレート
2b 下部プレート
3 位相差板
4 偏光板
5 パネル固定枠
(c)
2a
5
1
2b

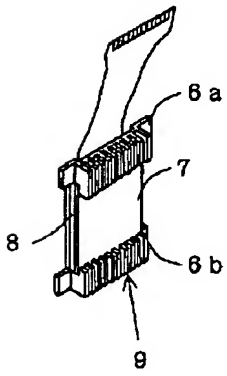
[Drawing 3]

(a)



6a，6b 放熱フィン
7 透明ガラス基板
8 液晶パネル
9 一体物

(b)



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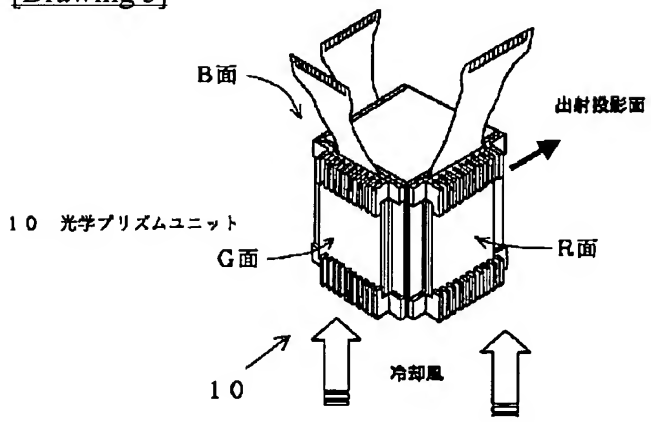
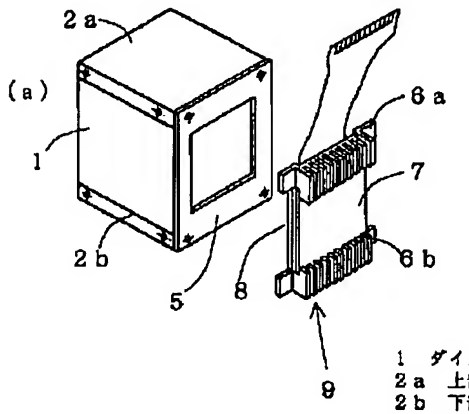
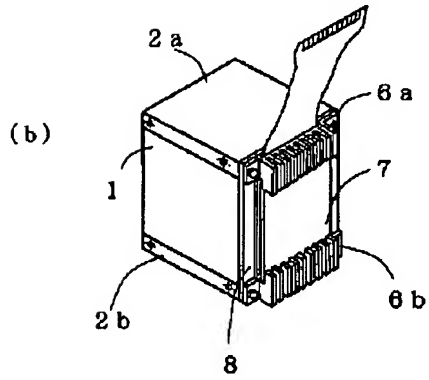


[Drawing 4]

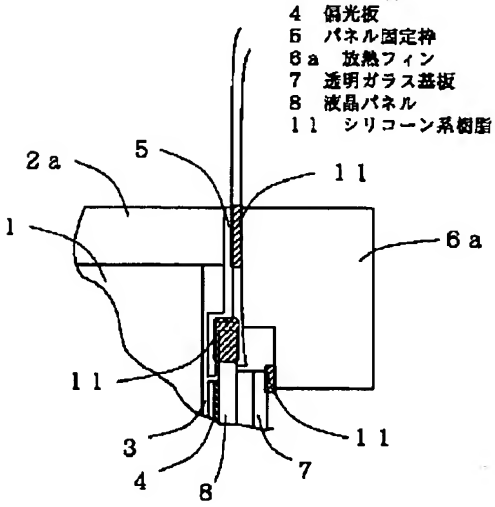


1 ダイクロイックプリズム
2a 上部プレート
2b 下部プレート
5 パネル固定枠
6a, 6b 放熱フィン
7 透明ガラス基板
8 液晶パネル
9 一体物



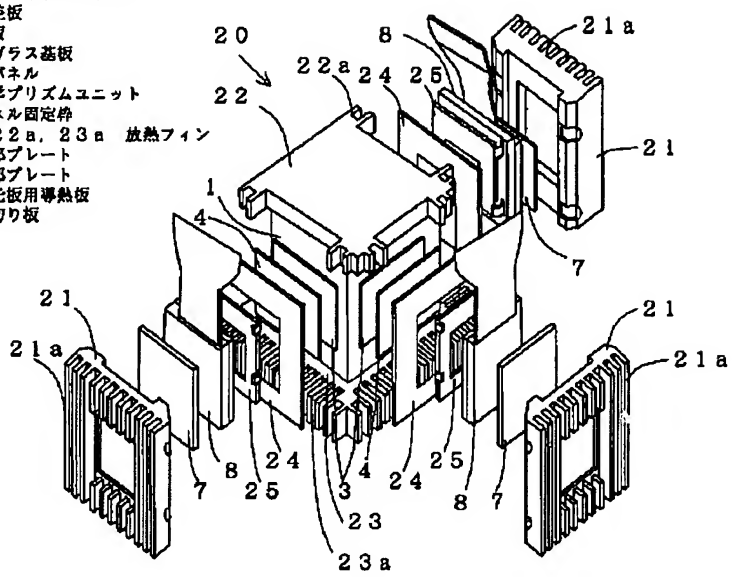
[Drawing 6]

1 ダイクロイックプリズム
2a 上部プレート
3 位相差板
4 偏光板
5 パネル固定枠
6a 放熱フィン
7 透明ガラス基板
8 液晶パネル
11 シリコーン系樹脂



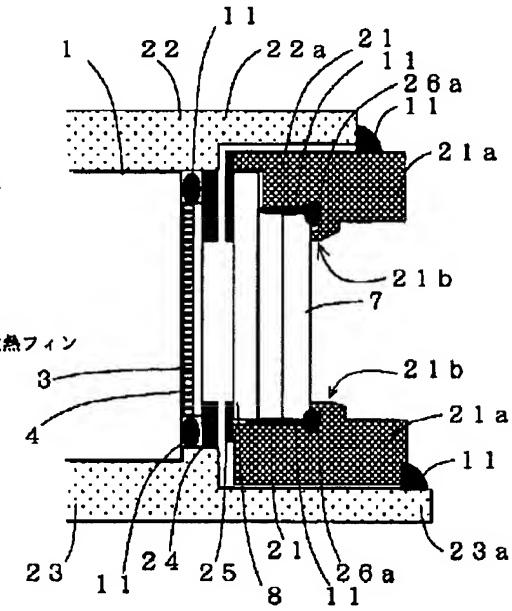
[Drawing 7]

1 ダイクロイックプリズム
3 位相差板
4 偏光板
7 透明ガラス基板
8 液晶パネル
20 光学プリズムユニット
21 パネル固定枠
21a, 22a, 23a 放熱フィン
22 上部プレート
23 下部プレート
24 偏光板用導熱板
25 見切り板



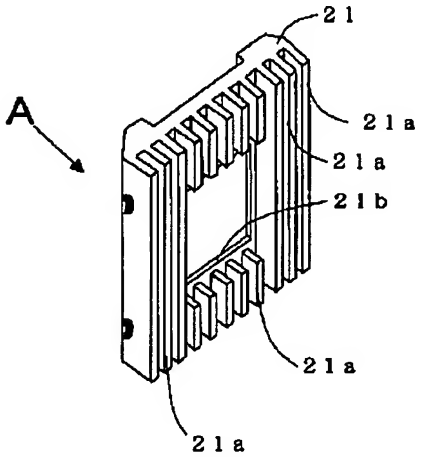
[Drawing 8]

1 ダイクロイックプリズム
3 位相差板
4 偏光板
7 透明ガラス基板
8 液晶パネル
11 シリコーン系樹脂
21 パネル固定枠
21a, 22a, 23a 放熱フィン
22 上部プレート
23 下部プレート
24 偏光板用導熱板
25 見切り板
26a 接着部



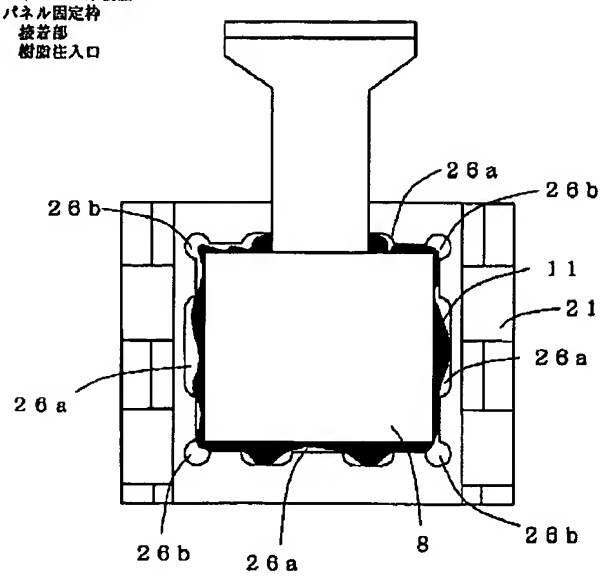
[Drawing 9]

21 パネル固定枠
21a 放熱フィン
21b 見切り部



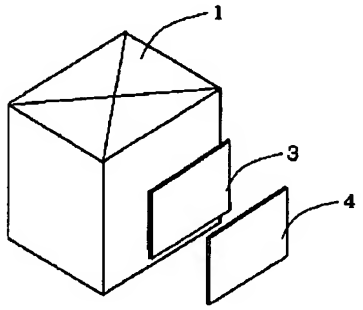
[Drawing 10]

8 液晶パネル
11 シリコーン系樹脂
21 パネル固定枠
26a 接着部
26b 樹脂注入口

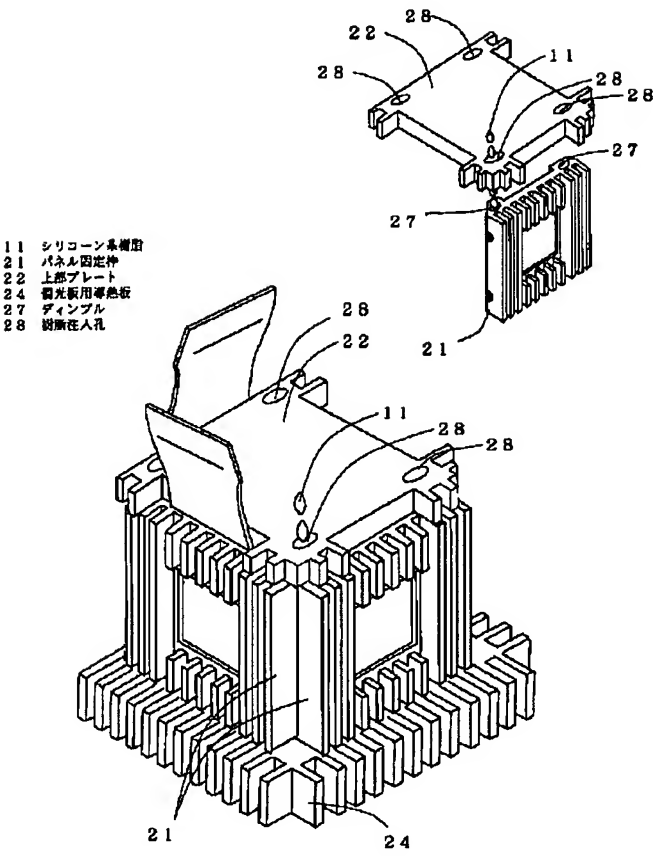


[Drawing 13]

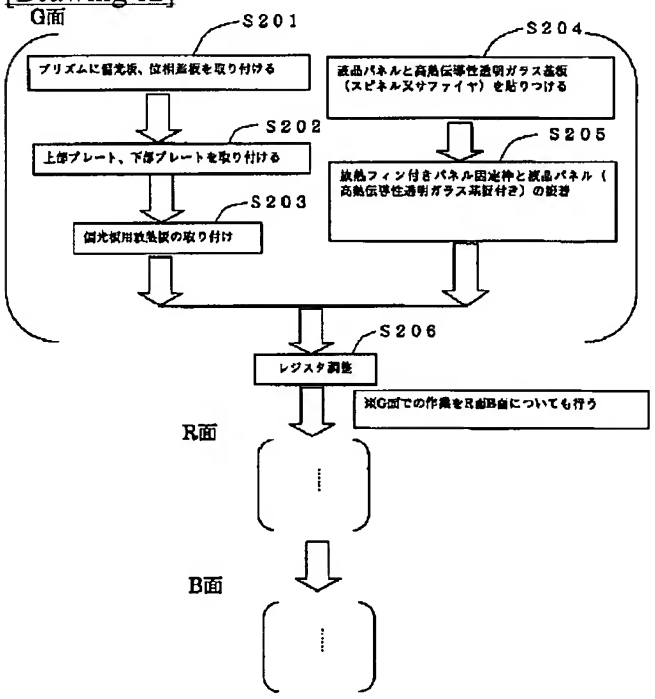
1 ダイクロイックプリズム
3 位相差板
4 偏光板



[Drawing 11]

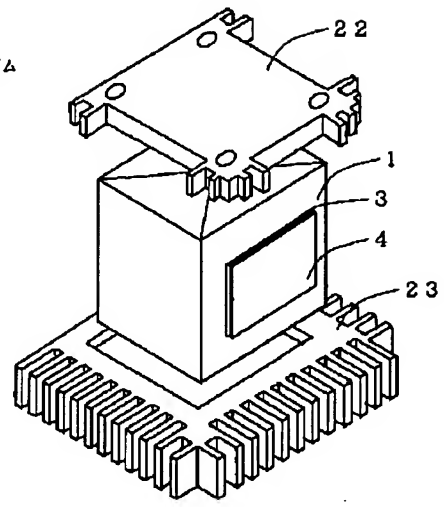


[Drawing 12]



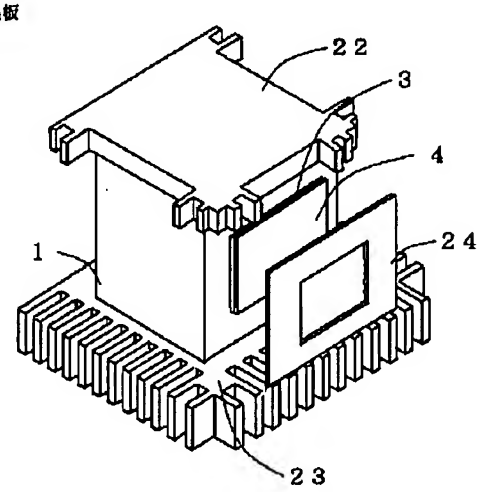
[Drawing 14]

1 ダイクロイックプリズム
3 位相差板
4 偏光板
22 上部プレート
23 下部プレート



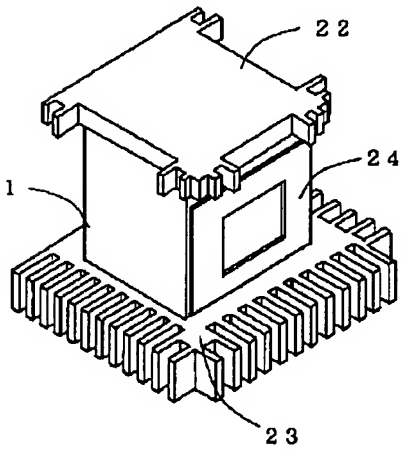
[Drawing 15]

1 ダイクロイックプリズム
3 位相差板
4 偏光板
22 上部プレート
23 下部プレート
24 偏光板用導熱板

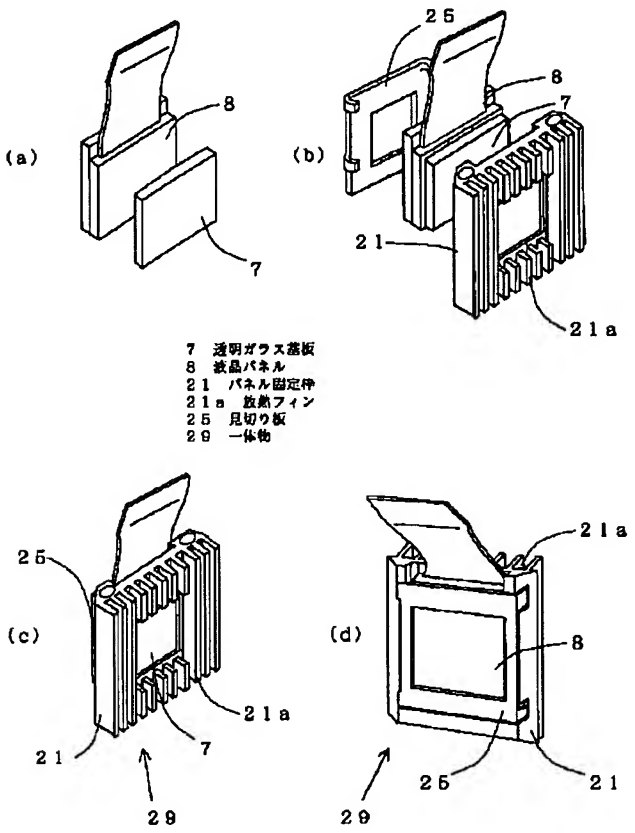


[Drawing 16]

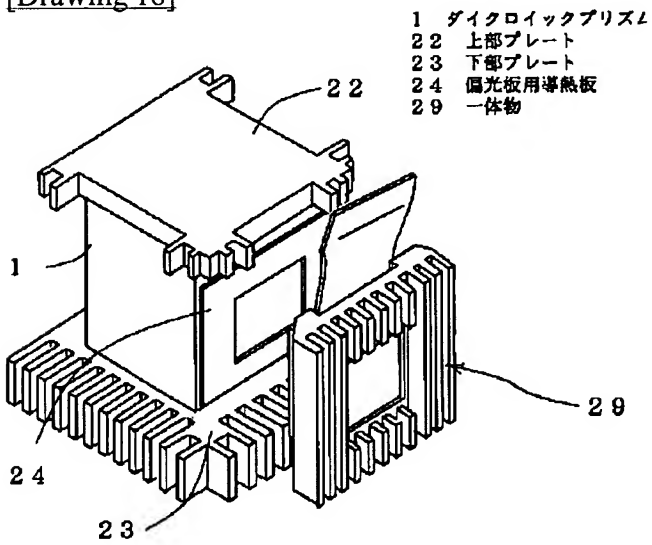
1 ダイクロイックプリズム
22 上部プレート
23 下部プレート
24 偏光板用導熱板



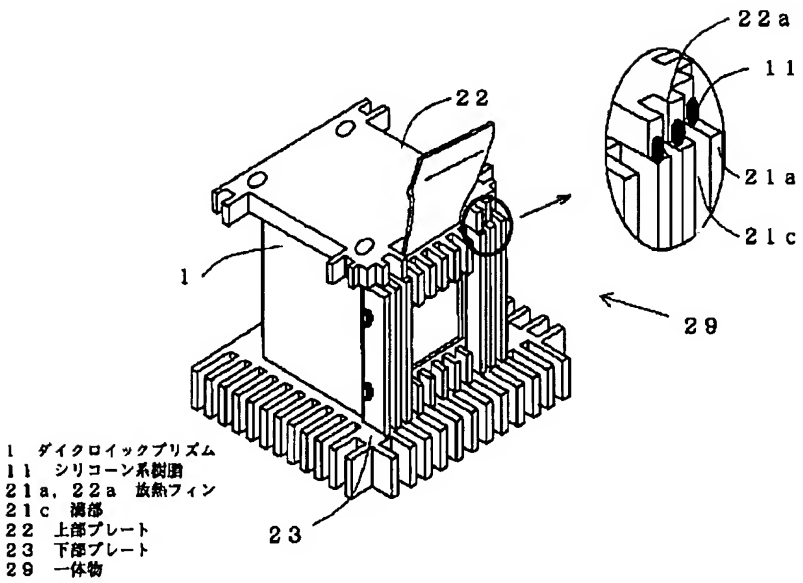
[Drawing 17]



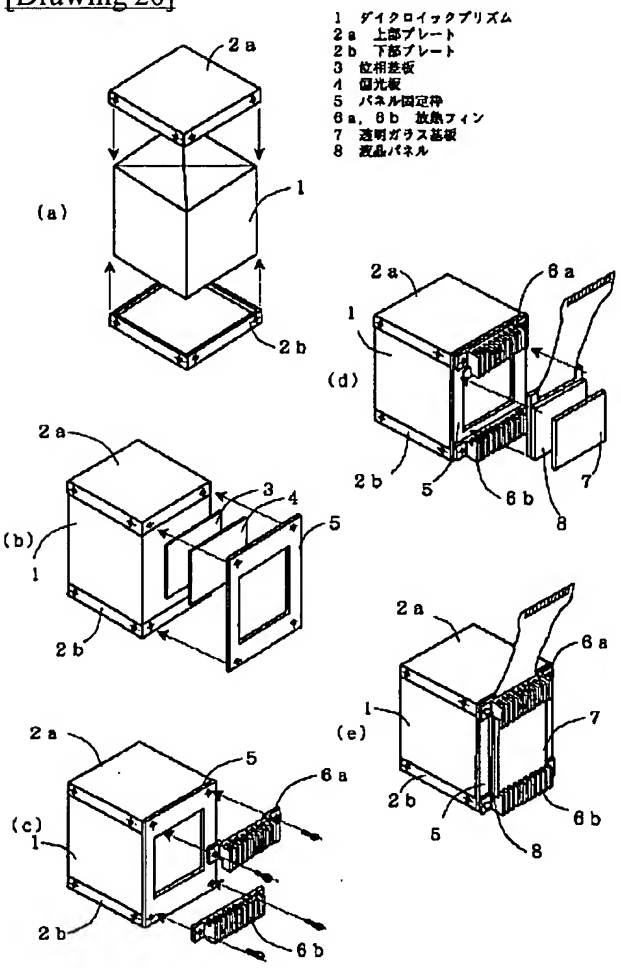
[Drawing 18]



[Drawing 19]



[Drawing 20]



[Translation done.]